

# RULES OF EXPONENTS

$$4x^5 \leftarrow \text{exponents}$$

coeff. ↑ base

$$3^8$$

RULE #1

$$a^m \cdot a^n = a^{m+n}$$

$$x^3 \cdot x^4 = x^7$$

$$(a^2 b^5 c^4)(a^3 b^2 c^9) = a^{5} b^{7} c^{13}$$

$$7^3 \cdot 7^2 = 7^5 = 16807$$

$$(2^4 \cdot 3^2)(2^1 \cdot 3^2) = 2^5 \cdot 3^4$$

$$= 32 \cdot 81$$

2560
+ 32
-----
2592

NEVER  
CHANGE  
THE  
BASE!

RULE #2

$$(a^m)^n = a^{m \cdot n}$$

$$(K^3)^4 = K^{12}$$

$$K^3 \cdot K^3 \cdot K^3 \cdot K^3$$

$$(2^1 3^3 5^5)^6 = 2^6 3^{18} 5^{30}$$

$$= 64 3^{18} 5^{30}$$

RULE #3  $\frac{a^m}{a^n} = a^{m-n}$ 

$$\frac{x^6}{x^4} = x^2$$

$$\frac{12 f^3 g^8}{4 f g^5} = 3 f^2 g^3$$

$$\frac{h^3}{h^7} = h^{-4} = \frac{1}{h^4}$$

RULE #4

$$a^{-m} = \frac{1}{a^m}$$

$$\frac{1}{a^{-p}} = a^p$$

$$9^{-8} = \frac{1}{9^8}$$

$$2^{-3} = \frac{1}{2^3} = \frac{1}{8}$$

$$5^{-2} = \frac{1}{5^2} = \frac{1}{25}$$

$$\frac{6^3}{6^5} = 6^{-2} = \frac{1}{6^2} = \frac{1}{36}$$

$$\frac{a^3 b^{-4} c^{-2} d^{+5}}{a^{-3} b^{+4} c^{-5} d^{+3}} = \frac{c^3 d^{11}}{a^6 b^6}$$

RULE #5

$$a^0 = 1$$

$$\frac{x^7}{x^7} = x^0 = 1$$

$$(4a^2b^8)^0 = 1$$

$$3a^1b^7 = 3b^7$$

$$(2a^7b^3c^{-2})^3 (2a^{-9}b^{-1}c^5)^{-2}$$

$$\frac{(2a^{-7}b^{11}c^{-5})^2 \cdot (2a^9b^3c^{-10})^0}{1}$$

$$\frac{2^3 a^{21} b^9 c^{-6} \cdot 2^{-2} a^{18} b^2 c^{-10}}{2^2 a^{-14} b^{22} c^{-10}}$$

$$2 a^{39} b^{11} c^{-16}$$

$$\frac{2^{2-1} a^{-14} b^{22-11} c^{-10+16}}{1}$$

$$= \frac{a^{53}}{2 b^{11} c^6}$$

## SCIENTIFIC NOTATION

$$243,000,000 = 2.43 \times 10^8$$

$$0.0792 = 7.92 \times 10^{-2}$$

$$2.3a^6 \quad 4.7a^3 = 10.81a^9$$

$$(\underline{2.3} \times 10^6) (\underline{4.7} \times 10^3)$$

$$= 10.81 \times 10^9$$

$$= 1.081 \times 10^{10}$$

# > 1 positive exponent  
# < 1 negative exponent

$$\frac{1.7 \times 10^{5-12}}{3.4 \times 10^{12}}$$

$$= 0.5 \times 10^{-7-1}$$

$$= 5 \times 10^{-8}$$